WHEN THE BIG PICTURE IS TOO BIG: A SIMPLER ALTERNATIVE TO HABS/HAER[1]

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Abstract. Documentation to Historic American Building Survey/Historic American Engineering Record (HABS/HAER) standards has long been the chosen method for mitigating losses of historic structures, but such rigorous documentation can be expensive and may not be warranted for many abandoned mine sites. Detailed HABS/HAER recording can be excessive for utilitarian, vernacular industrial or agricultural structures such as those found on mines or ranches. As an alternative, a less formal intermediate level of recording may be appropriate for certain types of features. This "sub-HABS/HAER" documentation uses sketches and medium format photography instead of measured drawings and large format photography. Utah has used "sub-HABS/HAER" documentation to mitigate adverse effect several times. Recent projects are profiled in this paper, including one case of recording an exceptional headframe in response to a National Historic Preservation Act Section 110(k) "anticipatory demolition" situation.

Additional Key Words: National Historic Preservation Act, historical mitigation, historical photodocumentation, anticipatory demolition, Jennie mine, Mohrland

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Introduction

Every abandoned mine reclamation organization sooner or later runs into Section 106 of the National Historic Preservation Act of 1966 (NHPA, 16 USC 470). This section of the act requires planners of federally funded projects to consider their effects on cultural resources. The act recognizes that not everything can be saved, nor does everything deserve to be saved, but history needs to be one of the social values weighed in the project planning. Damage to or alteration of cultural resources (defined as properties eligible for the National Register of Historic Places) needs to be offset or mitigated. Most abandoned mines are almost by definition historic and many are important enough to be eligible for the National Register. Reclamation often means substantial alteration, if not total obliteration of the mine, as hazards are eliminated or the land is restored to its pre-mining condition. The stage is set, then, for regular excursions down the Section 106 path.

Most SMCRA[3]-based reclamation programs are now mature enough that Section 106 compliance is a routine part of their project planning procedures. Most of the bugs have been worked out long ago. While the Utah Abandoned Mine Reclamation Program (UAMRP) values history and respects the need for preservation of our mining heritage, it recognizes that doing so comes at a cost. In Utah, NHPA Section 106 compliance is the second largest category of budget expenditures for contracted professional services after inventory/engineering. Substantial staff time goes into managing consultant contracts and shepherding cultural survey reports through reviewing agency archeologists. Any improvements that expedite the process and reduce the costs of Section 106 compliance, while still achieving the goals of the NHPA, are welcome.

Mitigation and HABS/HAER

The Historic American Buildings Survey (HABS) was created in 1933 as a New Deal program to put architects and photographers unemployed by the Depression back to work. Its mission was to document the nation's architectural heritage. HABS was supplemented in 1969 by the Historic American Engineering Record (HAER), created to document engineering and industrial sites (NPS, 2006). The twin programs, part of the National Park Service, are commonly referred together as HABS/HAER.

HABS/HAER has set the standards for archival documentation of cultural features. HABS/HAER documentation is designed for a shelf life of 500 years. Accordingly, there are stringent standards for content, format, and materials. Acid-free archival bond paper is required and even the type of ink used is

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[3] The Surface Mining Control and Reclamation Act of 1977 (30 USC 1201 *et seq.*). SMCRA established the federal Abandoned Mine Reclamation Fund administered through the U.S. Office of Surface Mining. Reclamation programs funded through SMCRA are the core constituency of this conference.

specified. Photographic negatives must be large format (4"x5", 5"x7", or 8"x10") and thoroughly washed to remove all processing residue. HABS/HAER recording requires qualified professionals and specialized equipment, which are rare and consequently expensive.

The point of mitigation is to preserve the key values of something at risk in some form, even if the item itself cannot be saved. Mitigation under Section 106 often consists of data collection— documenting the cultural resource before it is altered or destroyed so that there is a lasting record of what once was. Documentation compliant with HABS/HAER standards is often mandated. However, the expense and difficulty of HABS/HAER documentation has prompted a search for alternative methods to mitigate adverse effects.

A minor criticism of HABS/HAER documentation has been that, once the materials are archived in Washington, the materials are relatively inaccessible to the general public. That criticism is less valid today, since the collections have been digitized and are available online (at www.cr.nps.gov/habshaer/coll/index.htm). Nevertheless, some State Historic Preservation Offices (SHPO's) have looked beyond documentation for alternative mitigation methods that bring history to the people. Reasoning that a photo album and report sitting on a shelf preserve a record of history but do not promote the public knowledge and awareness of history, SHPO's have accepted mitigation efforts that are more interpretive than strictly documentary. For instance, Utah has produced a guidebook for a driving tour of historic coal mines and company towns as part of a mitigation package. The mitigation plan for Utah's Cottonwood Wash Project included collection of oral histories, installation of an interpretive roadside sign, and publication of articles in a regional historical journal.

Alternative Documentation

Another mitigation tack has been to document sites, but to avoid some of the excesses that make HABS/HAER so expensive and difficult. This approach recognizes that not all historic features are equal. Not every historic structure is Pennsylvania Station or Monticello. A livestock shed cobbled together by a rancher from logs and salvaged lumber does not require the same intensity and detail of recording as a Frank Lloyd Wright prairie-style rambler.

This school of thought is particularly well suited for abandoned mine situations. While there are many historic mines with sophisticated architecture and technologically complex processing facilities that deserve the complete HABS/HAER treatment, many National Register eligible mines consist of a simple hole in the ground. Perhaps it is shored up with some timbers and maybe it has a simple windlass for a hoist. Many historic mines were low tech operations. Old time miners were thrifty sorts, often scavenging equipment and structures from one mine for use on another. Even historically significant, highly productive mines can have little in the way of extant features that merit the detailed recording that goes into a HABS/HAER package.

The idea that different types of documentation are appropriate for different situations was promoted by Athearn (1990). He identified three levels of site documentation. Level I is the most basic. It includes recording the site location, condition, and significance, with the location shown on a map and the description supplemented by 35mm photographs and sketches. It roughly corresponds to the type of information recorded on the Intermountain Antiquities Computer System (IMACS) Site Form, a standardized cultural site recording form used by many state and federal agencies in the Intermountain West. Level II documentation adds research into the history of the site, measured drawings or dimensioned sketches, and medium format (120 film size) photography. Level III is standard HABS/HAER documentation.

Athearn's Level II recording differs from HABS/HAER in several ways that simplify the process and reduce costs. The product must still be archival (i.e. acid-free paper, residue-free photographs), but a reduction in detail is tolerated. Instead of professional architectural drawings, measured or dimensioned sketches or field drawings are used. These can be hand or computer drafted and done by anyone, not just an architect. Medium format camera equipment is much more widely available and requires less specialized training than large format cameras. The skill set required for Level II recording is considerably smaller than that needed for HABS/HAER.

Level II recording could be thought of as "HABS/HAER Lite." It records the same types of information, but not in as much detail, with a savings in time, effort, and expense. The tradeoff is acceptable because the types of sites suitable for Level II recording do not have a lot of detail to begin with. They may be utilitarian, vernacular structures, built from available materials to serve a function rather than to follow a blueprint. The sites may lack integrity due to the deterioration of time and weather. The sites may just be simple sites, with few material features, yet still significant historically.

Utah's Experience with Alternative Documentation

The UAMRP has managed to sidestep HABS/HAER recording as mitigation in recent years, largely corresponding to the shift away from coal mine reclamation to noncoal projects. Coal reclamation, which may sometimes completely obliterate a mine and return it to pre-mining conditions, obviously carries a high potential for "adverse effects" requiring mitigation. Coal mines in Utah also tend to have more surface facility development and retain more structural integrity than their noncoal counterparts, making documentation a likely and logical form of effect mitigation.

On the other hand, the UAMRP noncoal reclamation efforts have been constrained by the requirements of SMCRA. Most Utah noncoal reclamation is limited to shaft and adit closures (i.e. SMCRA Priority 1 sites). Utah noncoal mine sites typically have few structural elements and poor integrity. The UAMRP tries to be judicious in its closure design, choosing walls or grates that can be installed to avoid important historic elements of a mine when possible and limiting disturbance (see, for example, Rohrer 1997). More destructive closures (backfills) are reserved as much as possible for non-Register-eligible sites and low integrity sites. Earthwork disturbance is kept surgical and limited. As a consequence, the Utah SHPO has tended to see most noncoal mine closures as having "no effect" or "no adverse effect" in the context of Section 106. The basic data collected by the cultural surveys (roughly equivalent to Athearn's Level I) is generally seen as adequate to record most sites and no further documentation is needed.

Nevertheless, the UAMRP occasionally encounters situations requiring additional documentation as mitigation. In these instances it can be useful to have a range of recording options beyond HABS/HAER. Alternative "sub-HABS/HAER" recording has been done for several Utah projects, both in a formal Section 106 mitigation context and for less formal historical recording purposes. Some of these are discussed below. Examples of drawings, photographs, and narrative from these documentation efforts are included in an appendix at the end of this paper.

Formal Documentation for Section 106 Mitigation

Mohrland Project

The Mohrland Project was located in northwest Emery County near Huntington in a narrow canyon cut into the Wasatch Plateau by Cedar Creek. The Castle Valley Coal Company started the King mine in 1909 and established the company town of Mohrland (named from the initials of the company's founders—Mays, Orem, Heiner, and Rice) to support it. The mine and town expanded in 1912 under the new ownership of the United States Fuel Company; by the 1920's the town had 1500 multinational residents and a store, hospital, hotel, theater, amusement hall, and school. Mine entries were located upcanyon and a tramway hauled the coal 1.4 miles downcanyon through two tunnels to a tipple and rail yard. Coal mining ended in 1935 or 1938 and the mine and town were abandoned (Horn, 1993).

The cultural survey in 1993 identified 14 structures, 17 other features, 6 mine portals, and 4 coal refuse dumps. The mine was determined to be eligible for the National Register. Recognizing the historical values present, the UAMRP scaled back reclamation plans to eliminating safety hazards and protecting water quality. Portals and tunnels would be sealed and two large coal piles impinging on Cedar Creek would be removed, but most structures would be untouched. A cellar would be filled with soil and an eroding stone culvert would be stabilized.

The nature of the extant structures on the site was such that their demolition would have merited HABS/HAER recording. They are architecturally complex and interesting. As it was, the limited reclamation work proposed would not result in substantial alteration of the affected structures (e.g. the backfilled cellar could always be excavated to its pre-reclamation state). Features that would be more severely affected (portals, coal refuse piles) lacked the architectural components to warrant HABS/HAER recording. The archeological consultant recommended Level II documentation (specifically citing Athearn's work), which is what the UAMRP proposed to SHPO. This level of recording was ultimately submitted to the SHPO and accepted as mitigation.

The mitigation package recorded thirteen structures or features (Horn, 1995). The consultant recorded the site using a combination of sketches, computer drafting, and 35mm black-and-white film. The recording took three days of field time in early May, 1995, and the product was submitted at the end of the following June. The cost for the work was $3,950. The recording did not cause a delay in the project schedule. Reclamation construction followed in the fall of 1995 and spring of 1996, with additional minor work in 1997 and 1998.

<u>Stateline Project: Jennie Mine</u>

The Stateline Project was located in southwest Utah in the Paradise Mountains, in far western Iron County near the town of Modena and the Utah-Nevada border. The Stateline (or Gold Springs) mining district produced gold and silver, beginning in 1896 and ending shortly after World War II.

The cultural survey recorded 52 sites containing 80 mine openings slated for closure. Thirty-six of the recorded sites (31 mine openings) were determined to be eligible for the National Register. By selecting culturally compatible closures at eligible sites, the UAMRP was able make a "no adverse effect" determination for the project and did not need to mitigate adverse effects, with two exceptions discussed below.

The Jennie mine was the largest producer in the Gold Springs district. The U.S. Bureau of Mines reports the mine's lifetime production as 16,391 tons of ore containing 3,647 ounces of gold, 21,535 ounces of silver, 70 pounds of copper, and 140 tons of lead (Anderson, et al. 2002). The Jennie mine complex contained twelve identified features, including two adits, a shaft, a complex headframe and ore handling structure over the shaft, a trestle connecting the headframe to the mill, a large mill building, and several smaller buildings. The site complex is dramatic and picturesque and eligible for the National Register. At the time of the project planning, the main diagonal supports bracing the headframe had buckled and the headframe itself was listing slightly.

The UAMRP's reclamation interest in the Jennie mine was to address only the hazards posed by the shaft and adits. SMCRA funding could not be used either for demolition or stabilization of the hazardous structures. The shaft and adit hazards likely could have been abated with culturally sensitive methods, such as a polyurethane foam plug for the shaft or masonry walls for the adits. From a Section 106 compliance standpoint, the Jennie mine was no different than the rest of the project. The UAMRP could probably have proceeded with a "no adverse effect" determination without any mitigation needed for performing the closures.

However, the case at the Jennie mine was complicated by the landowner's plans for the site. The mine is on a patented mining claim and thus is private property. The headframe, ore bin, and mill complex was appealing and popular with mining history and ghost town enthusiasts. The mine was the subject of articles in the popular press and online promoting it as an interesting historical site and place to visit. The landowner was greatly concerned about his legal liability. He was unable to obtain homeowner's insurance for his personal residence in another state because he owned this hazardous abandoned mine property in Utah. The landowner unsuccessfully tried to sell the Jennie mine property and concluded that demolition of the structures was his only remaining viable option.

This odd confluence of circumstance and timing brought a different section of NHPA into play, Section 110(k)[4]. This section concerns the threat of "anticipatory demolition," the idea that a federal agency could take advantage of a private action and do an end run around its Section 106 responsibilities. For example, consider a highway project blocked by the presence of a significant prehistoric site. Under Section 110(k) an unscrupulous federal agency is not allowed to have someone else bulldoze the site beforehand to avoid Section 106 review and mitigation.

In this case, the landowner was acting independently of the UAMRP. Although the landowner's motivation was not to circumvent or preordain the outcome of our Section 106 review, the net effect of the demolition would have been to do just that. The landowner's action would have rendered mitigation of any potential effect by the UAMRP moot. It would be impossible for the UAMRP to mitigate effects of its actions by recording site features if those features no longer existed. Because of their respective timing, public and private actions were now commingled as far as Section 106 is concerned.

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[4] Section 110(k) of the National Historic Preservation Act (16 U.S.C. 470h-2) reads as follows: "(k) Each Federal agency shall ensure that the agency will not grant a loan, loan guarantee, permit, license, or other assistance to an applicant who, with intent to avoid the requirements of section 106, has intentionally significantly adversely affected a historic property to which the grant would relate, or having the legal power to prevent it, allowed such significant adverse effect to occur, unless the agency, after consultation with the Council, determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant."

In the face of a possible case of “anticipatory demolition” the AMRP proposed “anticipatory mitigation” to the SHPO. The AMRP proposed to mitigate the effects of both the public and private actions by fully documenting the site before the demolition occurred. The UAMRP followed the recommendations of the consultant who performed the initial cultural survey. The package differed from HABS/HAER primarily in the format of the photographs and drawings. Small format (35mm) negatives and scaled sketches were allowed. HABS/HAER archival standards were maintained. Only those features directly affected by the private and public actions would be recorded.

The mitigation package recorded ten structures or features (Boughton, 2003). The consultant recorded the site using a combination of sketches, computer drafting, and 35mm black-and-white film. The entire recording process, from start to final product, took four months (April-August) in 2003. The cost for the work was $18,938.52. The recording did not cause a delay in the project schedule. Reclamation construction followed in the spring of 2004.

Informal Recording

The Mohrland and Jennie mine mitigation was done to mitigate Section 106 “adverse effects.” The formal Section 106 process was followed, with notification of the Advisory Council and negotiation of appropriate documentation. The work was done by credentialed historians and the product complied with archival standards. The UAMRP has twice found it useful to supplement its cultural resource compliance with informal recording of potentially affected sites. This recording has been done pre-emptively before construction as a sort of insurance policy in case of unintentional damage to a site. No specific adverse effects had been identified during the Section 106 consultation for these cases, but there were tangible risks of damage. The informal recording is thus, strictly speaking, not Section 106 mitigation; it might more properly be thought of as a detailed appendix to the initial cultural survey work.

This informal recording is done in-house using UAMRP staff with no professional historical training. In Athearn’s terms, the level of recording is somewhere between Level I and Level II. Research and historical context setting are downplayed in favor of recording the features on the ground with drawings and photographs. Usually only the specific at-risk structures or features are recorded, rather than the entire site. The product is not fully archival. It is submitted to the SHPO for local curation.

Stateline Project: Lesser Headframes

Besides the exceptional Jennie mine headframe and mill complex, the Stateline project had several other smaller, simpler headframes and hoists of various designs. Two were situated over shafts in such a way that there was a chance of accidental damage during the mine closure construction, say from a careless backhoe operator. As a precautionary measure, these were recorded by the UAMRP. The construction of the headframes was simple and well within the capabilities of someone with basic photography and drafting skills to record.

The UAMRP recorded both sites using a combination of sketches, computer drafting, and black-and-white film and color digital photography (Rohrer, 2005a). As it turned out, both mine closures were installed without disturbing the headframes, so there was no immediate benefit. However, the documentation is now part of the written record, and when the structures finally succumb to wind or rot, the details of how they were built will still exist.

Cherry Creek Project

The Cherry Creek Project area consists of a number of underground hardrock metal mines in the West Tintic mining district at the south end of the Sheeprock Mountains in Juab County. Lead, silver, gold, zinc, tungsten, and copper were the primary commodities. Mining in the area dates back to the 1870's. Production continued into the twentieth century but mostly ended around the time of World War II (Clements, *et al.*, 2003).

One National Register-eligible shaft had a very simple arrangement of planks shoring up the collar. The planks extended above grade where they could interfere with the installation of the proposed steel grate closure; they might need to be removed to install the grate. At another eligible site, an errant welder's spark went undetected at the end of the shift and overnight ignited a fire that consumed the shaft collar cribbing and also damaged an already fallen down headframe that lay next to the shaft.

The UAMRP recorded both sites using a combination of sketches, computer drafting, 35mm black-and-white film, and color digital photography (Rohrer, 2005b). At the fire site, pre-fire inventory photographs were coupled with additional photos and measurements to salvage as much information as possible from the site to include in the package. At the other site, it was necessary to remove the collar shoring to install the grate closure; the pre-closure documentation served its purpose of preserving a record of how the shaft was before the closure.

Conclusion

"HABS/HAER Lite" can provide a meaningful alternative to the full strength variety, with the potential for savings of time and money. When carefully applied with consideration for the nature of the resource, the choice to use lower intensity recording does not necessarily mean a loss of data. A smaller approach will suffice for some types of features. Also, the convenience and economy of smaller format photography can make it easier to shoot more images, compensating for the loss of detail. The decision to use lower intensity recording should be made in consultation with qualified professionals. Suitable candidates would include small, architecturally simple sites and sites with little remaining integrity. Informal recording can ensure that effects or potential effects to minor historic features not rising to the level of Section 106 “adverse effects” are still mitigated outside of the formal Section 106 system. The 4"x5" to 8"x10" negatives required by HABS/HAER capture exceptional detail, even in contact prints, but sometimes these big pictures are overkill.

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Rohrer, J. Chris. 2005b. Supplemental recording of mining features in the Cherry Creek area, Juab County, Utah. Report prepared for the Utah Division of State History by the Utah Division of Oil, Gas and Mining (February 2005).

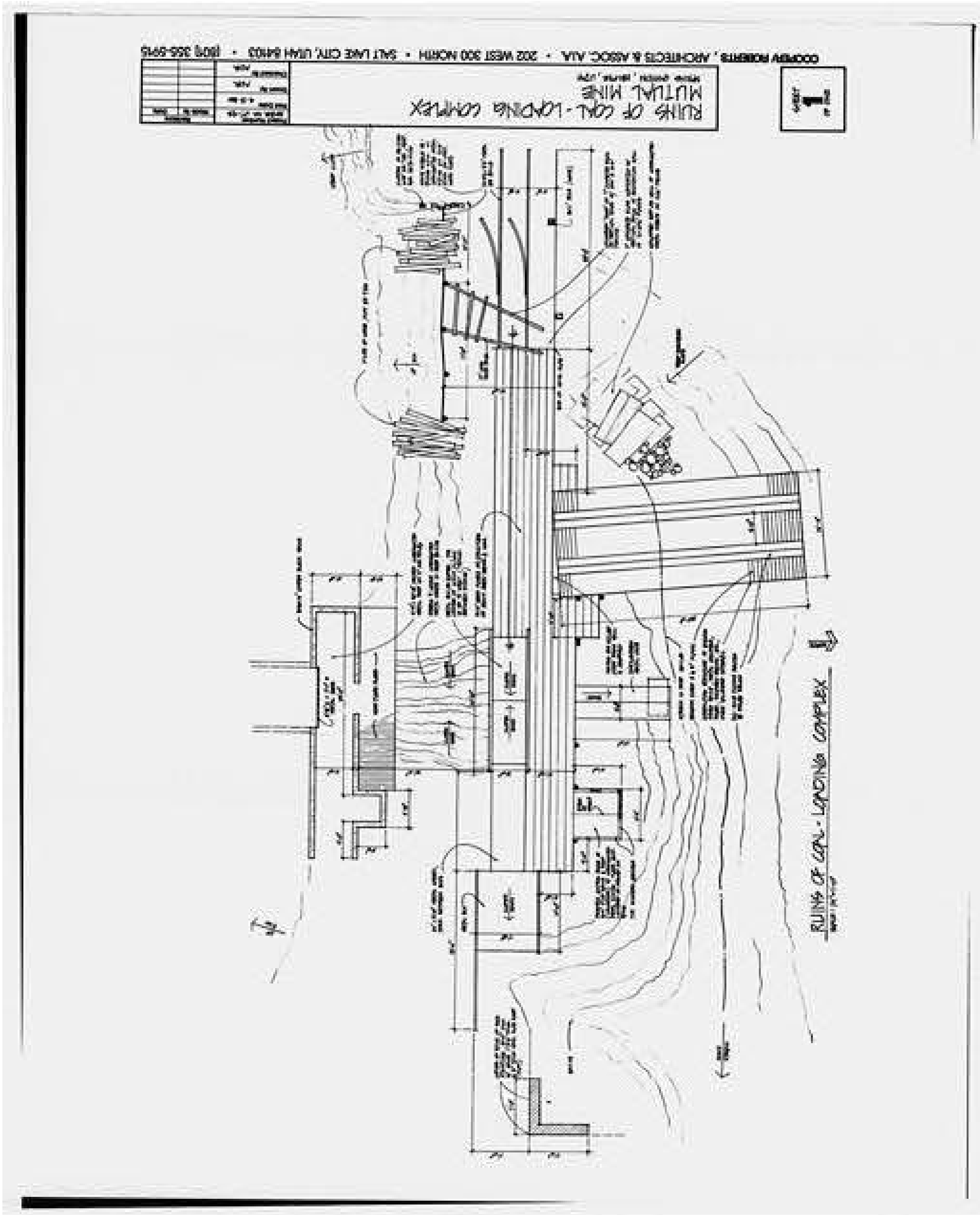
Appendix

Examples of HABS/HAER Documentation

Standardville Project. This coal loading structure built in 1924 at the Mutual mine in Spring Canyon, Carbon County, was part of a large coal reclamation project recorded in 1987 and reclaimed in 1988.
(Images downloaded from the Library of Congress "Built in America" website at: http://memory.loc.gov/ammem/collections/habs_haer/)

Photograph on 4"x5" sheet film.

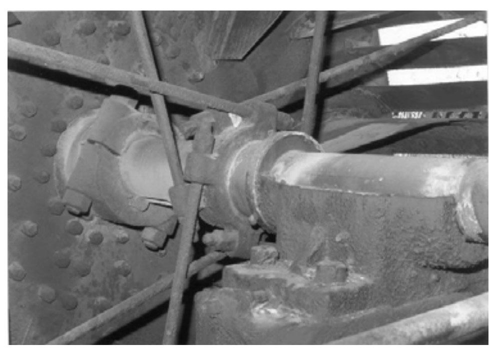
Detailed architectural drawing.

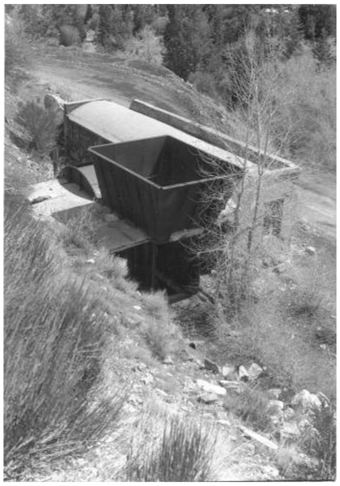


Examples of Formal “Sub-HABS/HAER Documentation”

Mohrland Project. These images and text are taken from the Mohrland mitigation report (Horn, 1995). The report includes 52 photos. Photos were shot on 35mm black-and-white film and included in the report as 3½"x5" prints.

Representative photos of the Mohrland fan house from the report.





Dimensioned sketches of the Mohrland fan house, showing plan view layout and two elevations. The sketches are sized for standard letter-sized paper.

FAN HOUSE (STRUCTURE 8)
PLAN VIEW MAP

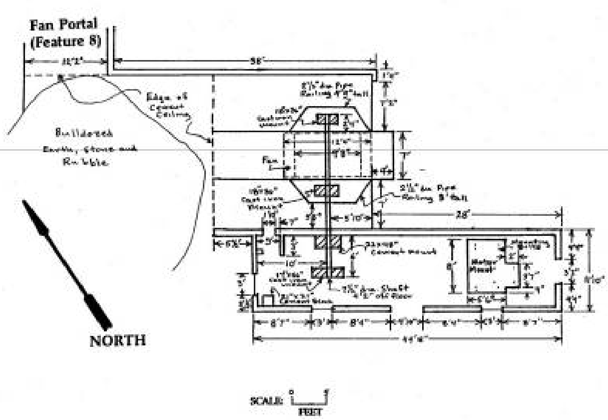


Figure 6. Plan view drawing of the Fan House (Structure 8)

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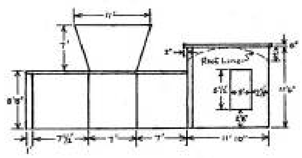
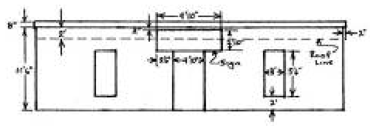
FAN HOUSE (STRUCTURE 8)



WEST ELEVATION



SOUTH ELEVATION

SCALE: 0 5 FEET

Figure 7. West and south elevations of the Fan House (Structure 8).

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Excerpt from the report narrative with a description of the fan house that supplements the photos and sketches and illustrates the level of detail to adequately describe the structure.

> The fan house is composed of a long, rectangular engine room on the south with adjoining bays surrounding the fan to the north and an extension of the northernmost fan bay extending to and around the fan portal (Feature 8) (Figure 6). The engine room measures 11 feet 10 inches by 44 feet 8 inches, oriented east to west. It is constructed entirely of poured concrete reinforced with railroad rails and wire rope. The roof is given its arcaded shape by a framework of curved railroad rails. The walls of the structure project above the roofline, forming somewhat of a parapet. The main entrance to the structure is through the center of the south elevation (Figure 7). Above the door is a name plate that reads: "1910 U. S. FUEL CO. 1916/ MOHRLAND MINE." The name plate is a recessed panel 34 inches tall and 9 feet 10 inches wide with incised letters in two rows. Single window openings flank the doorway. Another doorway is located in the center of the east elevation, and a window is in the center of the west elevation. The window and doors are no longer in place but were framed with sawn lumber and had plain board molding. The windows appear to have been double hung. A concrete engine mount with several upright mounting bolts is located on the east end of the room. This measures 5½ by 8 feet with a 2 by 3½ foot projection on the east. The shaft for the fan projects southward into the western portion of the room. It is supported by two cast iron bracket supports, one on a concrete base. The top bearing caps of both of these have been removed. A pulley was once mounted between the two supports that was connected by belt to the engine across the room. A doorway is located in the west end of the north wall of

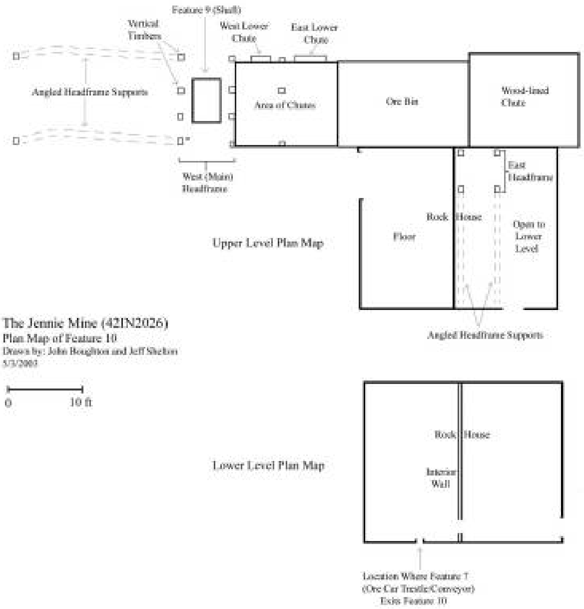
the room. It is partially enclosed by a concrete wall, probably to protect workers from the rotating equipment.

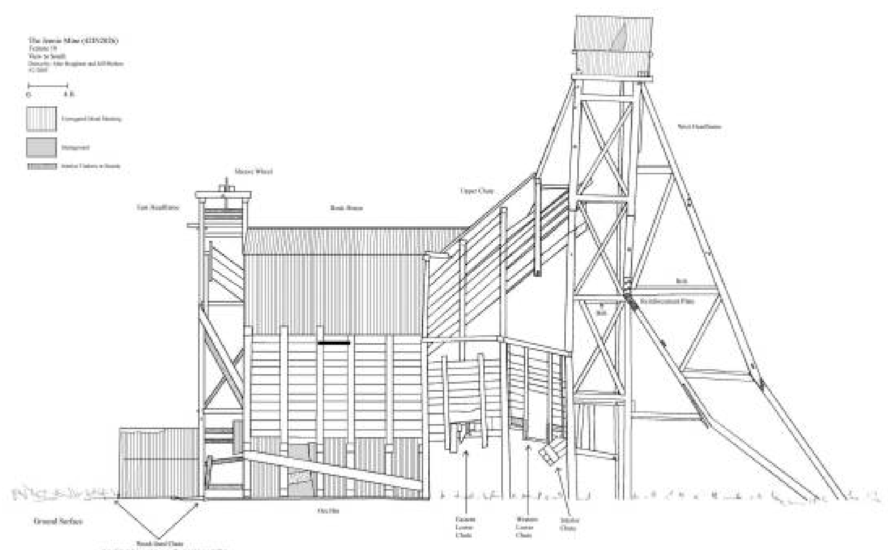
The fan is enclosed by a three bay sheet metal housing attached to the north side of the engine room. The first bay north of the engine room is 7 by 22 feet (east-west axis). The fan shaft that runs through it is supported by another cast iron bracket support with the top bearing cap gone. A 3-foot-tall guard rail made of 2½-inch-diameter pipe prevents entry to the open fan in the bay adjacent to the north. The east end of the bay is enclosed by an angle iron and iron sheet door. The hinges of the door are embossed with: "THE/ JEFFREY/ MFG. CO./ COL. O./ USA/ 23349." The Jeffrey Manufacturing Company was located at 904-999 North Fourth Street, Columbus, Ohio, and had sales offices throughout the country, including one in Salt Lake City. They were "Manufacturers of elevating, conveying, crushing, pulverizing, ventilating, portable loading, and transmission equipment," and appear to have specialized in equipment and machinery for coal mining, including fans and blowers (American Society of Mechanical Engineers 1927:412-413). The west end of the bay is presently open, but was certainly enclosed originally. The next bay to the north contains the fan. It also measures 7 by 22 feet. The fan is 12 feet 4 inches in diameter, has 48 fins, and has 8 adjustable tension rods per side. This is evidently a reversible double-inlet multiblade centrifugal mine ventilating fan (Hendrie & Bolthoff n.d.:246). At one time, the fan was completely enclosed by metal walls except on the upper west end, which was the air intake. The eastern portion of the bay has a curved shape, in conformity with the fan below, and extends about 3 feet above the flanking bays. The large metal doors on the west end have been removed as has some of the sheet metal housing on the east side. The air intake, through the west end of the roof of the bay, is made of heavy sheet metal. It extends 7 feet above the bay and flares outward 2 feet in all directions. As a result, it measures 7 by 7 feet at its base and 11 by 11 feet at its open top. The next bay to the north was the air exhaust room. Like the other bays it was enclosed with sheet metal, but was also connected to the fan portal by an enclosed cement room projecting to the west, giving the room a total size of 7 by 50 feet. This concrete room is almost entirely collapsed. The fan shaft extends only slightly into the bay and is surrounded by a 4 foot 4 inch tall guardrail made of 2½-inch-diameter pipe to prevent accidental entry into the fan itself. The end of the fan shaft is supported by a cast iron bracket that has had the top bearing cap removed.

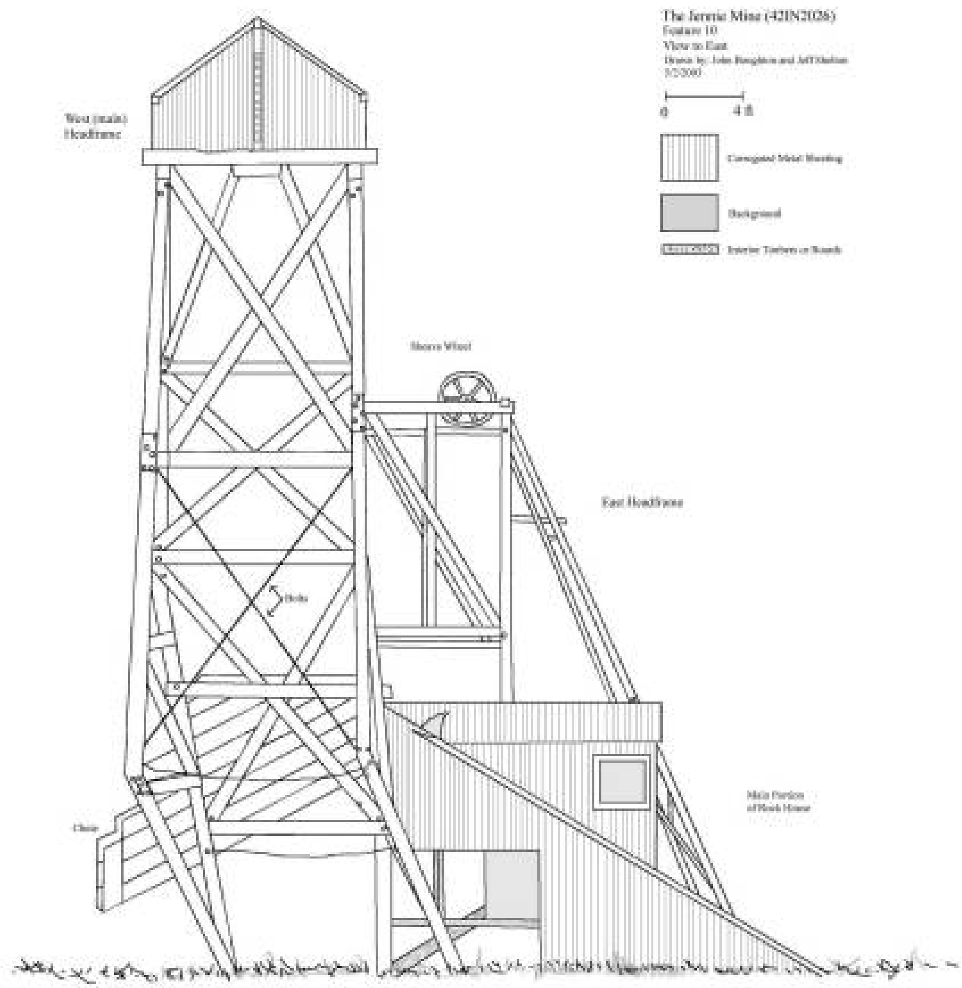
Stateline Project: Jennie Mine. These images and text are taken from the Jennie mine mitigation report (Boughton, 2003). The report includes 85 photos. Photos were shot on 35mm black-and-white film and included in the report as 4"x6" prints.

Representative photos of the Jennie mine headframe from the report.

Drawn-to-scale sketches of the Jennie mine headframe showing plan view layout and two elevations. The plan view sketch is sized for standard letter-sized paper. The two elevations are scaled to fit 24"x36" paper.







Excerpt from the report's narrative description of the Jennie mine headframe.

Feature 10 is a headframe/rock house (Figure 3.2) [appendices A and B]. Although the feature is still standing, it is in an advanced state of deterioration and is very unsound. The following paragraph describes the general layout of the feature. Feature 10 displays an irregular floor plan. The northeast portion of the structure is a wood-lined ore chute that is level with the ground surface; the chute measures 13 ft (N-S) × 15 ft (E-W). Located immediately west of the ore chute is an ore bin; the ore chute and the ore bin have a common N-S running wall. The ore bin measures 12 ft (N-S) × 18 ft (E-W). A series of ramps and chutes is located immediately west of the ore bin; the chutes and ramps comprise an area that measures 12 ft (N-S) × 14 ft (E-W). West of the chutes and ramps is the mine shaft (Feature 9) and the headframe that is located above the shaft. The vertical portion of the headframe measures 12 ft (N-S) × 6.5 ft (E-W). Support braces for the headframe extend 22 ft to the west. Another smaller headframe is located immediately south of the northeast chute and projects from the northern slope of the rock house roof; this smaller, east headframe measures 4 ft (N-S) × 5 ft

(E-W). The rock house is located immediately south of the northeast chute and ore bin (the southern wall of the ore bin serves as the northern wall of the rock house). The rock house measures 22 ft (N-S) × 27 ft (E-W).

The succeeding paragraphs describe in detail the individual constituent parts of Feature 10.

The northeast portion of Feature 10 is a wood-lined chute. The chute is uncovered and is constructed from horizontally aligned planks that measure 10" × 2" in size. The south and west walls of the chute are constructed from the same kind of planks; however, they are aligned vertically. The chute is level with the surrounding ground surface but funnels down to the lower level of the rock house. The chute is partially full of gravels and cobbles.

The ore bin is covered by a side-gabled, normal pitch roof topped with corrugated metal sheeting. The bin is supported by six 9" square vertical timbers and six 9" horizontal timbers connected via rabbet joints. The lower portion of the bin is lined with 11" × 2" planks and the middle portion of the bin is lined with 9" × 2" planks aligned horizontally. The lower and upper portions of the bin are clad with corrugated metal sheeting. An ore chute from the large western headframe enters the ore bin on the west elevation near the top of the bin. Another chute enters the east elevation of the ore bin from the small headframe to the east. Access to the top of the ore bin is provided via a door on the southern elevation. This door is covered with corrugated metal sheeting and is attached to the ore bin with strap hinges. Access to the door would have been from a narrow wooden walkway that is no longer present.

A series of chutes are located immediately west of the ore bin. The chutes are constructed from 11" × 2", 9" × 2", 7" × 2", and 5" × 2" horizontally aligned lumber attached to 7" square timbers. Three chutes are located in this portion of the feature. The largest chute is the highest of the three and is constructed in an E-W direction; the remaining two chutes are located below the large chute and are oriented in a N-S direction. The largest of the two lower chutes appears to be retractable; if this chute was lowered, it would extend out from the feature to the north.

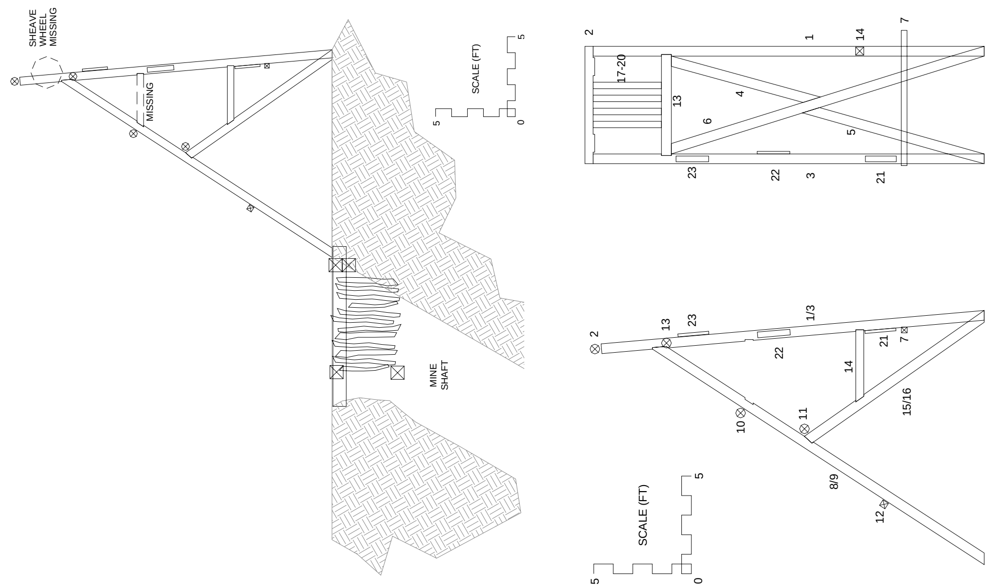
Examples of Informal "Sub-HABS/HAER Documentation"

Stateline Project: Lesser Headframes. These images and text are taken from the Stateline Project supplemental recording report (Rohrer, 2005a). The report includes 77 photos. Photos were shot on 35mm black-and-white film and were included in the report as 4"x6" prints.

Stateline Site 3321919VO001

Representative photos of the headframe from the report.

Computer drafted sketches of the headframe and components. Numbers refer to narrative descriptions in the report text.



Excerpts from the report’s narrative description of the shaft and headframe.

> At its core, the structure consists of two nearly vertical, sloping upright posts that hold the sheave wheel assembly, each braced by a diagonal post that supported the track haulage system. The braces rest on heavy timber beams lying on either side of the shaft opening. Cross-members between the two pairs of posts maintain the spacing between them and provide places to mount the sheave wheel and track. Other smaller components have been attached to the main framework as additional diagonal bracing.
>
> The headframe originally stood upright. Its southwest foot has slipped about three feet down into the shaft, causing the entire structure to twist and sag and partially disarticulate. In the accompanying line drawings, the components are shown in their presumed original positions. The photographs show their current positions.
>
> All aboveground wooden components are dressed round poles or milled timbers or boards. The round poles are all approximately six to seven inches in diameter. The milled timbers vary in dimension. The top several feet of the shaft are cribbed with raw juniper logs with branches trimmed. Larger components are joined using ½-diameter bolts or threaded rods with nuts and washers; smaller parts are fastened with wire (round) nails or spikes. The round poles generally have shallow notching (up to about 1 inch deep) at joints to provide a flat contact surface.
>
> …
>
> The base or corners of the headframe, as defined by the four main posts

(components [1]. [3], [8], and [9]) is 6 feet by 13 feet (outer dimensions). The headframe stands on the east side of a steeply inclined shaft that is approximately 8 feet by 8 feet (pre-closure eroded dimensions). The shaft's depth is unknown, but it extends beyond visibility limits (>50 feet). The shaft is surrounded by a mine dump (waste rock and uneconomic ore from the mine that was dumped onsite) on three sides. The top of the dump is relatively flat. It extends about 13 feet west of the shaft collar, 11 feet south, and 17 feet east. The southern margin of the top of the dump is about 35 feet long; the eastern margin is about 32 feet long. The dump is thinnest at the northwest corner and gets deeper towards the southeast, following the natural slope. This is reflected in the outslope of the dump— the outslope is about 20 feet long at the northeast and southwest corners and about 60 feet long at the deep southeastern corner. There is an old road leading to the toe of the dump from the main road in Johnny Canyon (this is the dashed line trail plotted on the USGS topographic map).

…

Components [1] and [3]:
6"diam x ~236" above ground. These are the two main posts that support the sheave block assembly. [1] is the southern post; [3] is the northern post. Measuring from the ground up, [1] has bolts at 12" high for the attachment to [6] and at 54" high for [7]. It is notched at 80-86" high for [14].

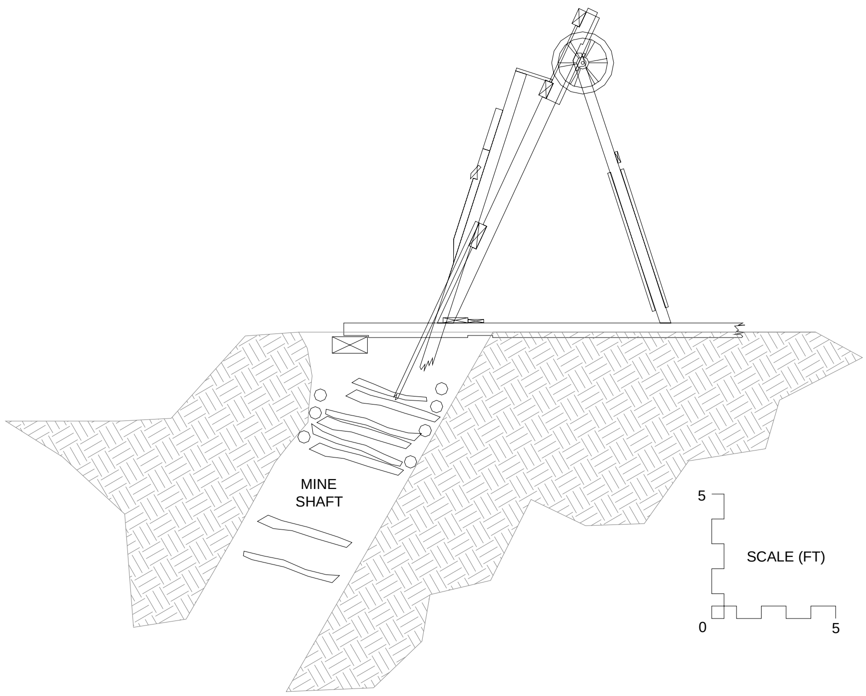
Component [2]:
6" diam x 72" (estimated). This is a horizontal crossmember that spans the tops of [1] and [3] and forms the top of the sheave block assembly. It is notched about 2" deep at the ends where it attaches to [1] and [3] and in the middle where it attaches to [17], [18], [19], and [20].

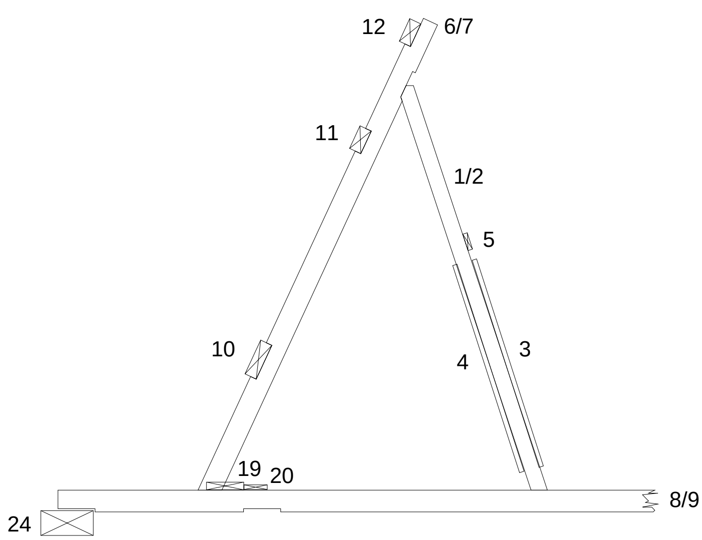
Component [4]:
6" diam x 90-99" (estimated). This, with [5] and [6], forms an X-shaped diagonal brace between [1] and [3] to lend lateral stability to the structure. The ends are cut at angles to fit snugly against the other components. Its length could not be measured, but judging from [5] and [6], it should be about 90-99" long.

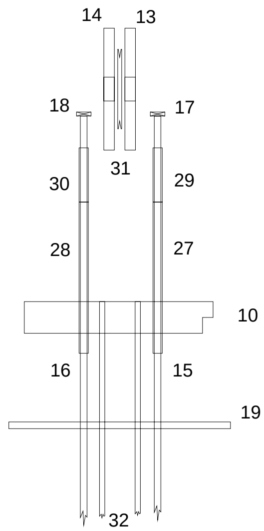
Stateline Site 3322024VO001

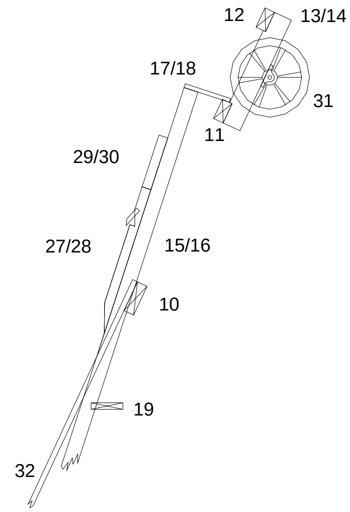
Representative photos of the headframe from the report.

Computer drafted sketches of the headframe and components, showing 1) the complete structure in context with the shaft, 2) the structural components isolated, and 3) the haulage/hoisting components isolated. Numbers refer to narrative descriptions in the report text.









Excerpts from the report’s narrative description of the shaft and headframe.

At its core, the structure consists of two sloping upright posts, each supported by a diagonal brace. The posts and diagonal braces rest on heavy timber beams lying on either side of the shaft opening. Cross-members between the two posts maintain the spacing between them and provide places to mount the sheave wheel and track. Other smaller components have been attached to the main framework as bracing and ladder rungs.

All aboveground wooden components are milled timbers or boards. The top several feet of the shaft are cribbed with raw juniper logs. Further down into the shaft juniper logs are used as props for roof support. Larger components are joined using ½-diameter bolts with nuts and washers; smaller parts are fastened with wire (round) nails or spikes.

…

Components [1] & [2]:
5” x 7” x ~140”. These form the primary diagonal braces for the main headframe posts ([6] and [7]). The lower ends are cut at an angle to stand flat on [8] and [9]. The upper ends are shaped with two angled cuts to fit into notches in [6] and [7] (see Figures 4 and 8). Besides leaning to the northwest to support [6] and [7], they also tilt inward towards the centerline of the headframe, i.e. the headframe tapers slightly from the base to the top (see Figure 9). The feet are approximately 78” apart (measured to the outer edges); the tops are approximately 60” apart (measured to the outer edges).

Component [3]:
1½” x 5½” x 95” (nominal milled 2” x 6” lumber). With [4], forms an X-shaped diagonal brace between [1] and [2] to lend lateral stability to the headframe.

…

Components [6] & [7]:
7” x 7” x ~165”. These are the main headframe posts that support the sheave

block and track haulage system. The lower ends are cut at about a 65 degree angle so that they stand flat on [8] and [9]. The top ends are cut square. The lower surface is 165” long; the upper surface is slightly longer due to the angle cut of the base. The lower surfaces are notched 17-26” from the top where they contact the tops of [1] and [2]. The upper surfaces are notched for the [10] and [11] crossmembers at 43” and 80” from the base (measured to the bottom of the notches) and for the [12] crossmember for about 10” down from the top end (see Figure 4). Component [7] has two additional shallow notches just above the [10] notch for unknown purposes. Besides leaning to the southeast to rest on [1] and [2], components [6] and [7] also tilt inward towards the centerline of the headframe, i.e. the headframe tapers slightly from the base to the top (see Figure 8). The feet are approximately 78” apart (measured to the outer edges); the tops are approximately 60” apart (measured to outer edges). The base of the headframe, as defined by the outer corners of [1], [2], [6], and [7], is approximately 78” x 100”.

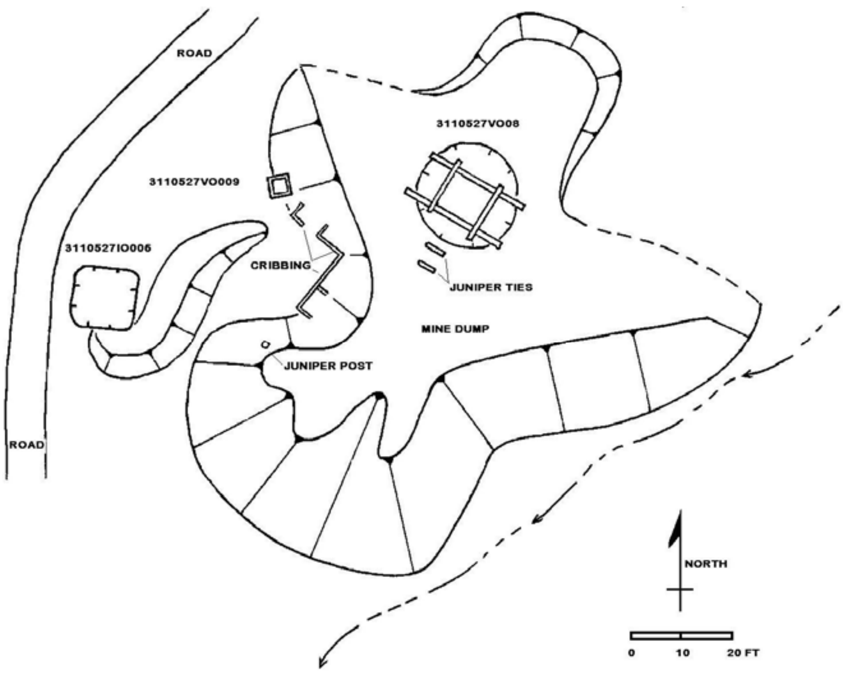
Components [8] & [9]:
7” x 12” x 155+”. These beams are footers that provide the foundation or support for the entire structure. They are aligned on a compass azimuth of 140/320 degrees. The northwest ends rest on [24], which defines the northwest side of the shaft collar; the southeast ends rest on grade and are partially buried. [8] and [9] are 60” apart, measured to the inner surfaces. The feet of [6] and [7] are 53-60” from the northwest ends of [8] and [9]. The feet of [1] and [2] are 147-153” from the northwest ends of [8] and [9]. [8] has a notch on its underside 60” from the end, presumably for a beam that would have been the counterpart of [24] and would have defined the southeast side of the shaft collar.

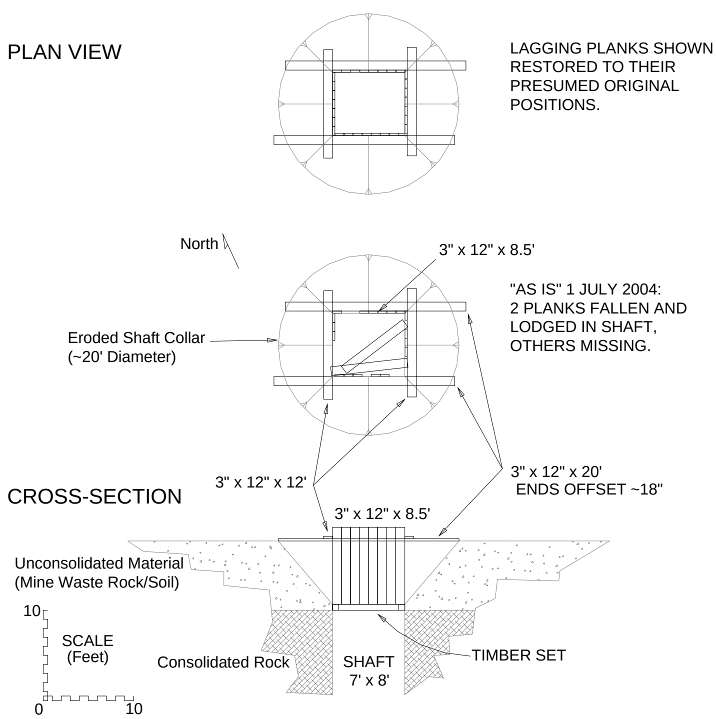
Cherry Creek Project. These images and text are taken from the Cherry Creek Project supplemental recording report (Rohrer, 2005b). The report includes 77 photos. Photos were shot on 35mm black-and-white film and color digital and included in the report as 4"x6" prints and color laser prints.

Cherry Creek Site 3110527VO008

Representative photos of the site from the report.

Hand drawn sketch map of the site layout and computer drafted plan view and cross-section of the shaft collar shoring structure. In the report the drawings were sized for standard letter-sized paper (scaled for 1 inch = 20 feet and 1 inch = 10 feet).





Excerpt from the report's narrative description of the shaft.

The feature consists of a vertical mine shaft with wooden collar support. The shaft itself is 7 feet by 8 feet in plan view and a reported 350 feet deep. The top of the shaft is collared in unconsolidated mine dump material for a depth of about 7 feet. The collar has sloughed or eroded to form a cone-shaped surface approximately 20 feet in diameter that funnels down to the rectangular shaft in bedrock. There is a timber set (supporting framework) of 6- or 8-inch square milled timbers around the perimeter of the shaft at 7 feet deep at the contact between the unconsolidated material and the consolidated host rock or bedrock. Viewed from the surface, the shaft appears to maintain a uniform rectangular cross-section once it enters the bedrock. The shape and extent of the underground workings are unknown.

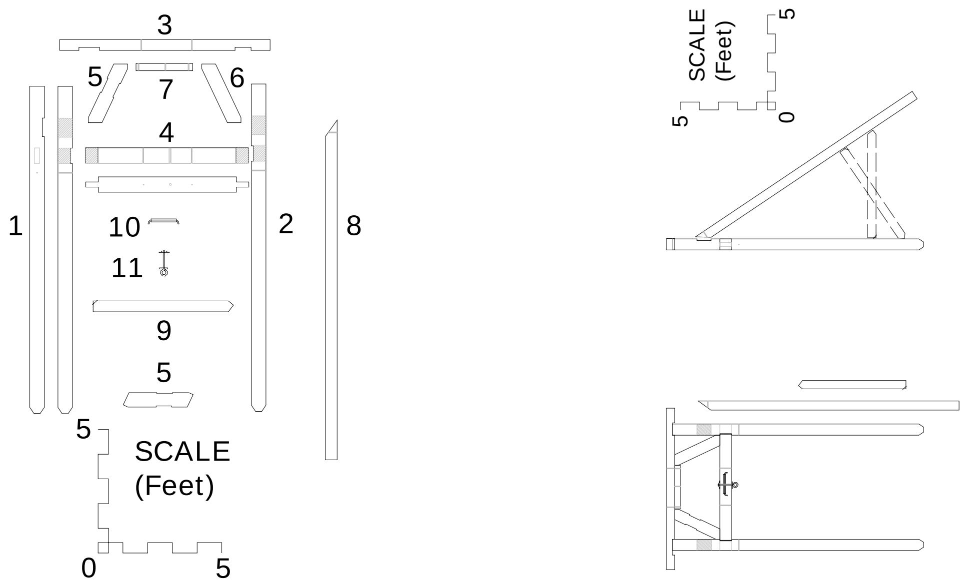
The shaft collar is shored with a wooden lining. Milled planks 3 inches by 12 inches by 8½ feet long stand on end on the timber set at the bedrock contact. There were originally eight such planks on each of the long, eight-foot sides and seven planks on the shorter seven-foot sides (as evidenced by weathering patterns on the wood). Seven of these planks were missing and two had fallen inward and were lodged on the timber set at the time of recording. Four longer planks at grade form an upper frame for the vertical shoring planks. Two 20-foot-long, 3-inch by 12-inch milled planks lie flat horizontally outside the shoring along the 8-foot sides at grade, with the ends resting on the mine dump. Two 12-foot-long, 3-inch by 12-inch milled planks lie flat horizontally on top of the first pair, outside the shoring, along the 7-foot sides with the ends hanging in midair. The vertical planks lining the sides of the shaft extend about 1½ feet above these four horizontal framing pieces. The structure is nailed together with wire (round) nails.

The shaft is surrounded by a large waste rock dump with two main lobes to the southwest. There are two juniper logs at grade in the surface of the dump immediately southwest of the shaft collar that appear to have been ties for a track haulage system. There is an excavation into the hillside northeast of the shaft to create a leveled area about 20-30 feet square with a cut bank about 6 feet high. Typically, one would expect to find a concrete or wooden foundation or mount for a hoist or engine in this location, but there was no surface evidence of such a feature. There is a juniper post one foot tall on the west outslope of the dump near the end of the lobe. The west side of the dump has two sections of juniper log cribbing, each about 20 feet long, 4-6 feet high, and meeting at right angles.

Cherry Creek Site 3110528VO009

Representative color digital photos of the shaft and headframe, taken before the fire damage.

Computer drafted sketches of headframe components. Numbers refer to narrative descriptions in the report text.



Excerpts from the report's narrative description of the shaft and headframe.

The shaft is 8 feet by 9 feet by 58 feet deep. Seven feet to the north is a second shaft (Feature 3110528VO010) that is 8 feet by 12 at grade. It is inclined to the south and intersects 3110528VO009 at a depth of approximately 16 feet. The two shafts share a large waste rock dump that extends to the west. The top few feet of the west sides of both shaft collars are unconsolidated mine dump material that was shored up by juniper log cribbing at 3110528VO009 and by a rock crib at 3110528VO010. An adit (Feature 3110528HO004) is located at the toe of the dump southwest of 3110528VO009. Its workings connect to the shaft.

…

At its core, the structure consisted of two upright posts, each supported by a diagonal brace. The posts apparently originally rested on concrete footers. (There are three footers extant, two between 3110528VO009 and 3110528VO010, and one at the southwest corner of 3110528VO009.) Horizontal crossbeams between the two posts maintained the spacing between them and provided places to mount the sheave wheel. All aboveground wooden components were milled timbers or boards. The shaft collar cribbing was raw juniper logs. Larger components were joined using ½-diameter bolts with nuts and washers; smaller parts were fastened with wire (round) nails or spikes.

…

Components [1] & [2]:
7” x 7” x ~156”. These are the two main headframe posts. The inner faces of

the posts are notched and cut with 2½" x 7½" mortises 30-37½" from the top for the joint with [4]. The front faces are notched 15½-24½" from the top for the joints with the tops of the diagonal braces ([8] and a now-missing counterpart). They are drilled 42" from the top for a steel rod that runs horizontally between the two posts below [4]. The lower ends are uneven and decayed, so the exact height of the posts is uncertain.

Component [3]:
7¼" x 5¼" x 102". This beam is a horizontal cross-member that forms the top of the headframe. It is notched 1½" deep at 9¼-19¼" and 85-92¾" from the end for the joints with [1] and [2]. It is drilled at 39½" and 64" from the end for steel rods that run vertically between [3] and [4].

Component [4]:
67" (plus two 6" tenons) x 7½" x 7½". This beam is a horizontal cross-member between [1] and [2] that presumably was the bottom of the sheave assembly. There is a 2½" x 7½" tenon on each end (oriented vertically) that extends 6" and fits into the corresponding mortises in [1] and [2]. The beam is drilled at 22" and 45½" from the end for steel rods that run vertically between [3] and [4] and at 35" from the end for an eyebolt (component [11]). A steel roller (component [10]) is mounted on the front face of the beam, roughly centered on [11].

Note: The digital images used for the figures in this paper have been resized from the originals to keep the file size of the electronic version of this paper manageable and within the submission guidelines. The downsized images have adequate resolution for letter-sized printed copies of the paper, but they show a noticeable loss of resolution when viewed and enlarged electronically. They do not reflect the quality of the source images submitted for Section 106 mitigation purposes. High-resolution original images are available from the author.